

REMARKS

Following the present amendments, Claims 1-4 stand pending in the present application. By this Amendment, Applicants have amended claim 1 by incorporating the subject matter of canceled claim 5 into that claim. Applicants submit that in light of the present amendments, the application has been placed in condition for allowance for reasons as set forth below.

In the Official Action, the Examiner objected to the specification for including the term "per time" on page 9, line 13 stating that exact unit of time is necessary. Applicants respectfully submit that the term "per time" on page 9, line 13 of the specification means "each time". "Time" does not indicate a length of time but instead refers to one instance of adding oxygen. That is, oxygen is fed into the gas phase at various times, and the amount of oxygen fed each time was 0.35 grams. Applicants have amended the specification to remove "per time" and replace with "oxygen fed process" so that the specification now reads "From that time, oxygen was fed into the gas phase at various times in an amount of 0.35 grams (11.00 mmoles) per oxygen fed process." Therefore, Applicants respectfully submit that the amendment to the specification alleviates the Examiner's objection.

Claims 1-5 were rejected under 35 U.S.C. §103(a) as being unpatentable over Berry et al. (U.S.P. 2,559,629) (hereinafter "Berry") in view of Japanese Energy Corp. (JP 5-78277) (hereinafter "JP '277"). The Examiner argues that Berry teaches the [de]synthesis of fluoroalkylcarboxylic acid,  $H(CF_2)_8COOH$ , from the reaction of the corresponding fluoroalkyl alcohol,  $H(CF_2)_8CO_2OH$  with nitric acid and dinitrogen tetroxide,  $N_2O_4$ . Further, the Examiner argues that the reaction vessel is initially

exposed to open air and then sealed and heated (citing Berry, column 6, lines 61-75 and column 7, lines 1-8). The Examiner admits that Berry does not mention the use of metal catalysts and does not indicate that oxygen takes part in the reaction. However, the Examiner asserts that JP '277 discloses synthesis of 3,3,3-trifluorolactic acid (a fluoroalkylcarboxylic acid) by oxidation of 3,3,3-trifluoropropane-1, 2-diol (a fluoroalkyl alcohol) with nitric acid in the presence of copper. Further, the Examiner argues that the application of fluorocarboxylic acid in the beginning of the reaction as mentioned in claim 4 is anticipated because the oxidation is preferably carried out in an acidic media (Examiner citing Berry, column 4, lines 2-6). Still further, the Examiner argues that it is well known in hydrocarbon oxidation employing nitric acid that the introduction of oxygen reduces the required amount of nitric acid to a stoichiometric amount or less relative to the reaction substrate. Therefore, the Examiner argues that this same technique could be applied to halogenated hydrocarbons as recited in claim 5 as a logical extension of the same principle and is therefore anticipated. This rejection is traversed for the reasons that follow.

Contrary to the Examiner's assertion, the present invention is not anticipated nor made obvious by the cited references, either singly or in combination, and more specifically, the individual and combined teachings of the prior art fail to disclose or suggest the claimed process.

For example, the Berry et al. reference cited by the Examiner ("Berry") only discloses polyfluoroalkanoic compounds and their preparation. As shown in Example VII, the process of Berry uses an excess amount of nitric acid relative to hexadecafluorononanol,  $H(CF_2)_8CH_2OH$ . Nitrogen peroxide ( $N_2O_4$ ), which acts as an oxidant, is also used. Even though the reaction vessel is initially exposed to open air as

pointed out by the Examiner, the amount of oxygen dissolved in the reaction solution would be low. Thus the oxidation of the hexadecafluorononanol appears to be achieved with nitric acid or nitrogen peroxide.

In contrast, according to the present invention, oxygen is fed into the reaction system during the oxidation reaction and the oxygen in the reaction system takes part in the oxidation reaction. Therefore, the required amount of nitric acid can be reduced to a stoichiometric amount or less.

Further, JP '277 fails to disclose or suggest "feeding oxygen into the reaction system during the oxidation reaction." Moreover, JP '277 does not mention that the introduction of oxygen into the reaction system can reduce the required amount of nitric acid to a stoichiometric amount or less relative to the fluoroalkyl alcohol.

The Examiner notes on page 3, lines 4-9 of the present specification that Applicants acknowledge that it is known that in hydrocarbon oxidation employing nitric acid, the introduction of oxygen reduces the required amount of nitric acid to a stoichiometric amount or less relative to the reaction substrate (John W. Ager, Jr. DE 2116212) (hereinafter DE '212). Contemporaneously filed with this Amendment is an Information Disclosure Statement submitting a copy of DE '212 and a copy of the corresponding U.S. Patent No. 3,678,106 (hereinafter '106).

Contrary to the Examiner's assertion, however, the oxidation process of DE '212/U.S. '106 fails to make anticipate or make obvious the claimed oxidizing process of the present invention. In particular, U.S. '106 only discloses oxidation of p-xylene and/or p-toluic acid to terephthalic acid in an aqueous medium, and specifically discloses that a methyl group is oxidized to a carboxyl group to produce terephthalic acid. In sharp contrast, the present invention provides a process for producing a

fluoroalkylcarboxylic acid, which comprises oxidizing a fluoroalkyl alcohol. In other words, in the present invention, unlike the prior art, a hydroxyl group is oxidized to produce a fluoralkylcarboxylic acid.

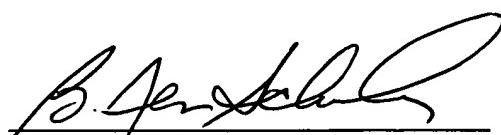
Thus, these oxidation reactions of U.S. '106 and the present invention have totally different reaction mechanisms. Therefore, applying the technique disclosed in U.S. '106 to fluoroalkyl alcohols is not disclosed or suggested in that reference and thus does not anticipate or make obvious the present claims.

Accordingly, for reasons as discussed above, the present invention is clearly unobvious over a combination of the cited references. Applicants thus submit that the present invention as particularly set forth in amended claim 1 and its dependent claims are clearly patentable over the cited Berry, JP '277 and DE '212 references, either singly or in combination, and that the Examiner's rejection on the basis of these references is respectfully traversed.

In view of the foregoing, Applicants respectfully submit that the present application is in condition for immediate allowance, and such action is earnestly solicited.

Respectfully submitted,

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